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Zero Retries is an independent newsletter promoting technological innovation in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with 900+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Web version of this issue - https://www.zeroretries.org/p/zero-retries-0112

Request To Send

Editorial by Steve Stroh N8GNJ

Thanks Honey!

As I explain in every issue, Zero Retries wouldn't be *possible* without the behind-the-scenes help and unflagging encouragement of my wonderful wife Tina KD7WSF. As this autopublishes, Tina and I should be enjoying a nice dinner on the occasion of our 39th wedding anniversary.

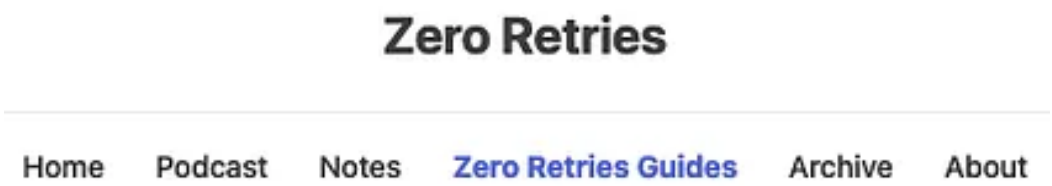
Happy 39th Anniversary Honey!

900+ Zero Retries Subscribers!

There are now 900+ Zero Retries subscribers! The last few subscribers needed to claim that threshold signed up shortly after Zero Retries 0111 published. Over the next few days, someone, somewhere mentioned Zero Retries, and a number of new subscribers came onboard. Zero Retries is now on the home stretch to 1000+ subscribers by the end of 2023.

Zero Retries Guides - In Progress

There are a number of recurring topics in Zero Retries. Substack can publish static webpages that don't appear in the "feed" of published newsletters, but that feature wasn't usable until recently due to a longstanding bug, now fixed. That enables me to begin publishing Zero Retries Guides, the first one of which is Zero Retries Guide to Interesting Conferences.



As shown in the screenshot snippet above, the Zero Retries Guides will be accessible on an index page under the link Zero Retries Guides on the Zero Retries main page.

There will eventually be many such Guides, such as *Zero Retries Guide to Audio Interfaces and TNCs*, *Zero Retries Guide to Data Radios*, *Zero Retries Guide to VARA FM*, etc.

The idea of the Guides is to create a semi-static Guide, keep *that* up to date, then link to it in Zero Retries articles instead of explaining background in the article whenever I mention a new TNC, etc. This will streamline the editing of Zero Retries, and it will be less taxing for new readers of Zero Retries that they'll be able to get the basics of a topic from a Guide rather than have to sift through 100+ back issues of Zero Retries.

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Amateur Radio Data Networks ~~are~~ *aren't just* for… *Typing*?

By Steve Stroh N8GNJ

This is an update and Mea Culpa re: Zero Retries 0111 article Rebuttal to Don Rotolo N2IRZ's Digital Connection in May, 2023 CQ Amateur Radio.

Below, I reference both Terrestrial Amateur Radio Packet Network (TARPN) and NCPacket. The former is a well-established "template" for one implementation of an Amateur Radio Data Communications Network. The latter is a network built on the TARPN template (albeit the largest implementation to date).

I'm grateful for readers like Gary Kohtala K7EK and Tadd Torborg KA2DEW and Don Rotolo N2IRZ (colleagues in promoting Amateur Radio data communications) who provide timely and detailed feedback about topics in Zero Retries. Such feedback is especially important and welcome when I get something wrong such as one of my major points in the article referenced above. KA2DEW sent me a detailed email message, correcting my confusion - reprinted here with KA2DEW's permission.

Tadd Torborg Ka2dew Response Zero Retries 0111
123KB · PDF file
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I misunderstood *the intent* of the passage I quoted in N2IRZ's article:

> The only way for data to get onto the network is by typing it in – automated connections are not allowed.

What N2IRZ *meant* in the phrase "typing it in" *didn't preclude* email, or file transfers, Packet Bulletin Board System (PBBS) message transfers, or any number of other types of non-realtime data over a TARPN network.

What I now understand is that N2IRZ meant, and KA2DEW described in detail in his email, is that all traffic on a TARPN network is "initiated by a human *within the network*". My example for that philosophy is that TARPN permits the distribution of information such as Amateur Radio Newsline bulletins, but only via a network participant *manually* transferring that information into the TARPN network. As in *not interconnecting a TARPN node to the Internet* and setting up a script that *automatically* copies such information from the Internet into the TARPN network.

That's a philosophical distinction that could be debated, but if I was within the footprint of a TARPN network, and that policy is the consensus of the other network participants, even though I disagree, I would abide by the consensus. A *network only works* when the network users agree to use common parameters.

Networking on Purpose by Tadd Torborg KA2DEW

In response to my experiences with data-only repeaters, KA2DEW also offered a pointer to his article Networking on Purpose in which he offers a well-reasoned perspective on various network topologies including data-only repeaters as background for the specific network topology (*only* point-to-point links) used for TARPN networks. In fact, KA2DEW's conclusions about data-only repeaters in the section **Digital repeater as packet relay** closely mirror my observations. If carefully-chosen, common technical parameters are observed, data-only repeaters can work reasonably well (which is my primary observation from my experiences). In my opinion, KA2DEW's conclusions about the usability of data-only repeaters are mostly a few points of difference in philosophy, such as:

- The repeater is also likely to be located at a site not serviceable by most of the hams, or any, depending on the site. Emergency survivability is not assured.
- Supports a sysop vs users class system.

Time to Revisit the Data Repeater Paradigm?

Not to extend this part of the discussion and risk topic drift, but I think it's past time to revisit the previous paradigms of data-only (or shared-with-data) repeaters. It's now practical, and inexpensive, to *extend the classic repeater paradigm* such as having multiple inputs on different frequencies and different data speeds to a data repeater because software defined receivers *have changed the paradigm*. For example, a data repeater could be configured to transmit on the 222 - 225 MHz band at 9600 bps band using Improved Layer 2 Prototol (IL2P) because receivers that include that band, with sufficient bandwidth for 9600 bps, are now very inexpensive. Some will find a 222 - 225 MHz radio problematic, or expensive, so perhaps add to the repeater a 4800 bps receiver on 144-148 MHz and / or 440 - 450 MHz . Radios for those bands are inexpensive and ubiquitous and even if the radio isn't easily modifiable, they can almost always be used for speeds of 1200 / 2400 / 4800 bps.

Again, my thanks to Tadd Torborg KA2DEW and Don Rotolo N2IRZ for providing the inspiration for the previous article, and for providing great feedback for the major point I got wrong.

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2023 ARRL Technical Innovation Awards

By Steve Stroh N8GNJ

Celebrating the recognition of technological innovation in Amateur Radio!

From the minutes of the ARRL 2023 Second Board of Directors Meeting on July 21 - 22, 2023:

29. Directors Vizcarrondo, Baker, and Boehner moved, seconded by Second Vice

President Vallio that:

WHEREAS, The ARRL Technical Innovation Award is granted annually to the licensed radio amateur or to individuals who are licensed radio amateurs whose accomplishments and contributions are of the most exemplary nature within the framework of technical research, development and application of new ideas and future systems in the context of Amateur Radio activities;

WHEREAS, The ARRL's Programs and Services Committee serves as the award panel and reviews the nominations received from the members, and selects the winner(s) of this award;

WHEREAS, James C. Ahlstrom, N2ADR has made major contributions to ham radio hardware and software by creating the Quisk SDR transceiver, and through designing numerous other innovations within the Hermes Lite 2 SDR hardware transceiver platform. All software products are open-source and free to users;

WHEREAS, Pierre-Emmanuel Deliou, W4CKX, is the leader of a team that includes Ahmet Inan (no callsign) of Gilching Germany and developed the Ribbet app for Android devices. The innovative and open-source Ribbet app allows amateurs to utilize audio from amateur radio transceivers such as VHF/UHF handhelds to send and receive text messages across the devices. The Ribbet app utilizes OFDM technology, currently seen in cellular 4G and 5G networks and WiFi, and

WHEREAS, Tadd Torberg, KA2DEW and Rene Carrillo, KK4HEJ, developed an affordable and configurable TNC for amateur radio packet radio operation, the NinoTNC, and sold them at production cost for the benefit of amateurs. When the major supplier of TNC modems that supported the Terrestrial Area Packet Network (TAPN) went out of business, Tadd and Rene reworked the NinoTNC modem to be compatible with requirements of the TAPN network, and again sold them at production cost to amateurs, with hundreds of unit sales since.

THEREFORE, be it resolved that the ARRL Board of Directors, with the recommendation of the Programs and Services Committee does hereby bestow *2023 ARRL Technical Innovation Awards* to James Ahlstrom, N2ADR, Pierre-Emmanuel Deliou, W4CKX, and Tadd Torborg, KA2DEW / Rene Carillo, KK4HEJ.

The Motion was **APPROVED** by unanimous vote (with applause).

A few corrections (I've followed two of these three projects closely):

- The "Ribbet" (actually, *Ribbit*) app hasn't yet been released; the name of the *project* is Ribbit, and the prototype app that's been released is called *Rattlegram*.
- As I understand the history, Ribbit wasn't developed for Amateur Radio; it's a general use data communications app that can be used with *any*1 two way radio, especially inexpensive portable radios that aren't intended for data. The only mention of Amateur

Radio use of Ribbit that I found on the Ribbit web page was on a PDF of a poster.

- KA2DEW's name is Tadd *Torborg*, not "Torberg".
- KK4HEJ's forename *is* Rene, but in every mention of him in conjunction with TARPN or the NinoTNC that I've ever seen, his preferred forename is *Nino* (as in *Nino*TNC).
- The name of the organization that KA2DEW and KK4HEJ are affiliated with is *Terrestrial Amateur Radio Packet Network (TARPN)*, not Terrestrial Area Packet Network (TAPN).

I was not aware of N2ADR's Quisk software (not hardware). It's impressive that it was first released in 2008 and has been maintained since then. My congratulations to N2ADR on this award!

I'm very glad that W4CKX and Inan received one of the 2023 ARRL Technical Innovation Awards for Ribbit. I think it's well deserved - Ribbit is a neat, innovative app. Even as a beta release, I'm guessing it's being used to good effect in some places. The ARRL Technical Innovation Award seems to be for the use of Orthogonal Frequency Division Multiplexing (OFDM) for audio signals, which makes Ribbit more robust and usable than acoustic coupling would be otherwise. But, in my opinion, Ribbit's *most novel aspect* is that it uses *acoustic* coupling:

- To transmit, audio from smartphone speaker → Radio microphone (or speaker / microphone), with Push to Talk Button pushed.
- To receive (most of the time, standby), audio from radio speaker → smartphone microphone.

My primary satisfaction at the 2023 ARRL Technical Innovation Awards is the recognition of KA2DEW and KK4HEJ for their work on the NinoTNC. They're both amply deserving of such recognition.

I may have influenced this award as I submitted the following nomination (one of several) for ARRL Technical Innovation Award in April, 2022. My nomination was acknowledged via email by Steve Ewald WV1X, ARRL Field Organization Supervisor.

> Name: Tadd Torborg (on behalf of the TARPN team)
> Call Sign: KA2DEW
>
> …
>
> Comments: TARPN has re-thought, and re-engineered Amateur Radio Packet Radio networking. They have identified weak points in "traditional" packet radio networking and architected TAPRN networks to eliminate those weaknesses. In addition, TARPN has created its own hardware - the "TARPN NinoTNC is a USB 1200/2400/4800/9600 baud KISS-TNC project by KK4HEJ."
>
> TARPN's activities and plans are well-documented, well supported, and are mostly

> open-source (the NinoTNC is not). The NinoTNC is offered by TAPRN as a semi-kit (majority of parts must be procured by the builder) and this is a significant point of pride in TARPN participants.
>
> TARPN's primary contribution to technical excellence is in the development of a significantly simplified "KISS TNC" that retains backwards compatibility with legacy Packet Radio while incorporating important new features. It incorporates speeds of not just 1200 bps, but also 2400, 4800, and 9600 bps. In addition, the NinoTNC offers a unique, new Forward Error Correction mode called Improved Layer 2 Protocol (IL2P). IL2P was so well documented that the author of Dire Wolf Software TNC was able to independently create an IL2P capability for Dire Wolf that interoperates with the NinoTNC using IL2P. Notably TARPN, KA2DEW, and Rene N "Nino" Carrillo KK4HEJ frequently revise and improve the design of the NinoTNC to make it easier to build and more capable.

Again, congratulations KA2DEW and KK4HEJ - ***this award is well deserved!***

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Hawaii Wildfires and Cellular as Sole Communications

By Steve Stroh N8GNJ

A few Zero Retries style (not the usual) observations about communications in an emergency.

I have no significant background to offer about Amateur Radio's role in the Hawaii wildfires, thus I'll defer to Ria Jairam N2RJ's YouTube video - Where's ham radio in the Hawaii wildfires? for some reporting from sources. N2RJ discusses that Amateur Radio systems also stayed functional during the worst of the event… except the Amateur Radio systems built around Internet connectivity such as repeaters linked via Internet and Winlink.

It's not surprising that cellular infrastructure was destroyed… *nearly everything* in the affected areas of Hawaii was destroyed, thus its unrealistic to expect commercial[2] cellular infrastructure to survive when the building it's sitting on burns and collapses into rubble.

What *is* damning, once again in a disaster, is the defacto role of cellular phones as the *sole mass communications system available to most people*, and that people have come to expect that their cellular phones work all the time. *Until they don't*. We keep learning this lesson the hard way as people don't receive warnings in time, especially with fast-developing wildfires, and have no way to call for help[3].

Yes, there are neighborhood communications options such as those recommended in Community Emergency Response Team (CERT) concept (mostly Family Radio Service [FRS] and General Mobile Radio Service [GMRS] portable radios and repeaters, but my observation is that in a fast moving disaster such as a wildfire, those plans and "reserved for emergencies" equipment such as portable two way radios are forgotten in favor of higher priority items such

as photos, wallet / purse, pets, critical medications and your phone. You're literally running out the door hoping to be able to escape the fire (or flood, or other fast moving disaster).

The sobering reality for mass communications in an emergency is that most people no longer bother to equip themselves to receive broadcast radio and television. Very few people bother to have NOAA Weather Radio All Hazards receivers. Thus when cable, Internet, or cellular fails, most people have *no* means of communication.

ATSC 3.0 Might Help

I think the timing was coincidental, but within a few days of the Hawaii wildfires, Experimental Radio News 9 featured a potential solution. **From LPTV to 5G** described a FCC grant of a Special Temporary Authority (STA) to Milachi Media LLC to test a Low Power television broadcast station (LPTV) for special transmissions to mobile devices (tablets, smartphones) that have special chips for this experiment.

Note that while the STA is for a LPTV station, there's nothing inherent to LPTV that cannot be used by full-power broadcast television stations.

The technology used in this STA - ATSC 3.0 and a new generation of radio chips to receive a component of ATSC 3.0 transmissions, *might* be what it takes to be able to transmit lifesaving information to people in disasters when the cellular infrastructure fails. Unlike cellular infrastructure which is (by design) localized, low-profile and low power, television transmissions are high-profile and high power. If this experiment proves out the premise, in an emergency where cellular infrastructure has failed, you might be able to receive emergency instructions (what roads are open, what areas are safe to gather at) *on the device you have in your hand*… not the television that you left behind - regardless of whether cellular service is available.

Information Technology Disaster Resource Center (ITDRC)

In my viewing of the aftermath of the Hawaii wildfires, it seemed that the primary need for communications was in the many widely scattered shelters for displaced residents outside the affected areas. The displaced residents don't need Amateur Radio, they need basic Internet (Wi-Fi) / cellular connectivity to reunite with family and friends and figure out their next steps. *That* situation *is the mission* of Information Technology Disaster Resource Center (ITDRC), and they seem to be on this latest disaster:

> **Hawaii Wildfires**
>
> ITDRC is responding to wildfires in Hawaii. Teams are performing assessments for unmet needs on Maui to ensure survivors staying charged up and connected.

I'm seeing an increasing number of mentions about ITDRC. My impression is that ITDRC is increasingly becoming known in the Information Technology (IT) industry because its mission meshes with common IT skillsets - Internet and TCP/IP infrastructure, technologies such as routers, switches, Wi-Fi, etc. If you volunteer with ITDRC and you are asked to deploy, your IT skillsets *will* get put to good use. It helps that ITDRC's volunteer page shows photos of

volunteers that are young and diverse, and it also helps that ITDRC seems reasonably well-funded and coordinated nationally so that available volunteers and resources are known and standardized.

I'll reiterate here that, in my opinion, the combination of FirstNET, Iridium, Starlink, and now ITDRC is emergency communications *of the 21st century*.

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The Bigger Picture of RM-11953

By Steve Stroh N8GNJ

While I consider the technology that's being proposed in RM-11953 to be laughably impractical, and almost certainly won't be able to deliver the desired capability… because HF can get weird… that discussion is out of scope for this article.

Amateur Radio is missing the bigger picture of what RM-11953 portends - that Amateur Radio is no longer considered to be relevant to society.

First, Subscribe to Experimental Radio News (ERN)

If you're interested in, or vested in the outcome of RM-11953, I recommend subscribing to Experimental Radio News (Bennett Z. Kobb AK4AV, Editor) as it offers the very best "big picture" of what's going on, not just the… reactions… within Amateur Radio. Experimental Radio News 9 provides this introduction:

> Welcome back. We've often reported on High-Frequency Trading (HFT) stations licensed as experiments under FCC Part 5 rules. The new petition from Shortwave Modernization Coalition (SMC) seeks to permit non-experimental operation of such stations under Part 90 rules. Part 90 covers the business, safety and utilitarian uses of radio.
>
> Experimental HFT stations transmit time-sensitive financial data between the U.S. and foreign exchanges. The petition reveals more about these ventures, though nothing about their individual strategies or message contents. Shortwave listeners have observed peculiar signals thought to be from these stations.

The Zero Retries Bigger Picture Perspective on RM-11953

I've been asked why I haven't written about RM-11953 - Petition for Rulemaking [to Amend the [FCC's] Rules to Allow Fixed, Long-Distance, Non-Voice Communications Above 2 MHz and Below 25 MHz] of the Shortwave Modernization Coalition.

Basically, *I* have no expertise to assess whether, as proposed, such communications will

actually disrupt Amateur Radio communications, or not. Given that the spectrum in question isn't assigned to Amateur Radio, in my opinion, *the potential for interference to Amateur Radio operations* is the *only* standing that Amateur Radio Operators can legitimately comment on in RM-11953.

But, whether these new communications systems will disrupt Amateur Radio communications, or not, is, I fear, *largely moot*. The Shortwave Modernization Coalition (SMC) will probably make some minor modifications to their proposal in response to the ARRL's comments.

My fear over RM-11953 is that in the framing of RM-11953, Amateur Radio is being portrayed (and, apparently, generally perceived) as a quaint hobby of old men. If you think that's hyperbolic, *read* the Wall Street Journal article (courtesy of MSNBC)4.

In that article, there is *not a hint - **none*** of *anything* redeeming about Amateur Radio. Not emergency communications. Not technological innovation. Not involvement by youth in STEM activities or Summits on the Air. Not decades of involvement with the International Space Station. Etc. No, the WSJ article portrays Amateur Radio as a quaint hobby enjoyed by elderly men. ERN's Editor AK4AV sums it up well:

> At this writing, more than 800 comments were filed on the petition, many from radio amateurs objecting to it. A Wall Street Journal article portrayed these commenters as eccentric hobbyists and "clubs dominated by retired men" in a "battle for the airwaves" against ultrafast traders.

For the FCC to balance the *potential* harm to Amateur Radio, versus a well-funded effort from the SMC, which can marshal a legal and public relations push to the FCC commissioners, I don't think Amateur Radio can put up a significant argument. My guess as to how this will turn out is that the SMC will ultimately to be allowed to do almost entirely as they're proposing with some minor tweaks to appease Amateur Radio, such as setting up an "interference complaint department", perhaps providing funding to the ARRL to create such a thing.

Amateur Radio Usually Loses Spectrum Fights

Why do I think that SMC will get what it wants in RM-11953? Several reasons:

- Remember the Amateur Radio the 3.3 - 3.5 GHz band?
- Remember the Amateur Radio 220 - 222 MHz band?
- Remember the 26.96 - 27.23 MHz (11 meters) band?
- Remember how vigorous the protests from Amateur Radio that… *but, but, we're using it*?
- And more importantly, remember how the ARRL's Spectrum Defense Fund was used so effectively to prevent such losses from Amateur Radio? Or not?

Despite vigorous protests by Amateur Radio Operators and ARRL, those "takebacks" from Amateur Radio happened almost entirely *as requested in the original proposals*. Amateur

Radio could not then, and cannot now, offer a compelling argument why commercial interests such as the SMC should not be allowed to do almost entirely as they propose to the FCC. Especially given that they are not (currently…) proposing to operate within Amateur Radio spectrum.

Thus, if Amateur Radio usually loses those major, *existential* "fights" for removing spectrum from Amateur Radio use… why would we think that we can influence RM-11953?

To be fair, there have been a few industry proposals for sharing Amateur Radio spectrum that were not granted[5].

The most important factor for Amateur Radio to continue is whether it is perceived as relevant to society at large. I'm fond of quoting Dr. Karl Meinzer DJ4ZC on this point:

> Ultimately, amateur radio must prove that it is useful for society.

Unfortunately, Amateur Radio has nearly lost that battle of public perception.

What *Can* Amateur Radio Do About Its Perception?

I see three groups that could, *conceivably*, have influence on reversing the negative public perception of Amateur Radio.

- ARRL represents itself as the (US) National Association for Amateur Radio. Quick - name the last significant Public Relations activity that the ARRL has done? If you cite the video by the late Walter Cronkite KB2GSD… that was *two decades ago*. The current ARRL is entirely concerned with raising dues and paper magazine subscription fees.

- The ~20% of US Amateur Radio Operators that are ARRL members have not tried to influence the ARRL *to do* significant Public Relations activity on behalf of Amateur Radio. Not that they would be listened to if they tried - ARRL has creative ways to deal with dissenters to the stated direction of its CEO.

- Amateur Radio Digital Communication (ARDC), in previous years, has disbursed $5M - $6M in grants. ARDC has only two "great missions" in its charter - grantmaking and maintenance of 44Net. While ARDC has the financial ability to pay for a public relations campaign, to date, it has no demonstrated interest in doing so (unless someone shows up with a grant proposal to do so[6]).

The relevance of Amateur Radio to society, by highlighting technological innovation in Amateur Radio, is the lonely mission that I've identified for Zero Retries. Technological innovation *certainly isn't the only utility of Amateur Radio*, but it's the facet of Amateur Radio that *I'm* best equipped to advocate in Zero Retries.

From the Zero Retries perspective, what might… *conceivably*… help to reverse the perception that Amateur Radio is (again, quoting from the Wall Street Journal) only "eccentric hobbyists" and "clubs dominated by retired men" is a big Amateur Radio project to spark the imagination of techies, such as an Amateur Radio GEO Payload for the Americas. I'll have an update on that idea perhaps as soon as the next issue of Zero Retries.

We need… *something*… to show society that Amateur Radio isn't merely a quaint hobby of old men!

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Update to KiwiSDR In Progress

By Steve Stroh N8GNJ

KiwiSDR is a powerful standalone Software Defined Receiver that is self-hosted (no "host" computer needed) and designed to be operated remotely using a web browser. There is some good background info on KiwiSDR in the RTL-SDR.com article.

It's common in specialized interest groups that announcements often "bury the lede". The unstated background for this announcement is that the KiwiSDR has not been available for about a year, and it certainly sounded like KiwiSDR's creator John Seamons ZL/KF6VO was burned out from years of supporting KiwiSDR. Thus this announcement from ZL/KF6VO is encouraging news for the KiwiSDR community about the development of "KiwiSDR2":

> The PCB and bill-of-materials (BOM) are finished and ready for prototype construction.
>
> The problem is I don't know WHO is going to build this or HOW. So I don't know WHEN it might be available. And most importantly I don't know what it might COST.
>
> If YOU have *specific* ideas about these questions please email me. I'm especially interested in full-service manufacturing and distribution outside of China.

I hope a Zero Retries subscriber can offer some suggestions to ZL/KF6VO for where to get the KiwiSDR2 built somewhere other than China. Complex radio boards are, well, *complex*.

> KiwiSDR 2 Goals:
>
> - Minimal changes. Fastest time-to-market with lowest possible risk. BUT since the PCB is going to be re-spun fix some of the known limitations that don't add too much risk:
>
> - New RF front-end:
>
> - Balanced input via balun transformer
>
> - Digital attenuator (per the advisory group: pSemi PE4312, 0 - 31.5 dB, 0.5 dB steps)
>
> - Gas discharge tube (GDT) across input in addition to TVS diodes

    - Static drain resistors (100K) from input connections to ground
- External ADC clock brought out on third SMA connector
    - Self test loopback mode using a short cable between this SMA and antenna input
- New GPS chip to replace current one which is now EOL
- Reverse polarity protection (via P-FET) on 5V DC input
    - TVS diode across 5V input

Notably there's no indication that the KiwiSDR will be "re-hosted" for another embedded computer than the Beaglebone Black, but then there's little impetus to do so as the "BBB" is amply powerful, amply available, and reasonably priced.

The KiwiSDR (and thus, this upgrade) is notable for several reasons:

- KiwiSDR is well-optimized to be used as a receiver for the High Frequency (HF) bands. RTL-SDR.com explains this well:
The KiwiSDR has up to 32 MHz of bandwidth, so it can receive the entire 10 kHz - 30 MHz VLF/LF/MW/HF spectrum all at once.
- KiwiSDR is a very mature, stable, well-supported, frequently updated Software Defined Receiver. While I found references that there are *many* built-in decoders of digital modes such as Digital Radio Mondiale, I wasn't able to find a comprehensive list of decoders.
- KiwiSDR is optimized to be a *online* Software Defined Receiver accessed remotely over a network connection, and easily (and encouraged to be) shared. Notably, the KiwiSDR is *self-hosted* from the Beaglebone Black computer - all it needs is an IPv4 address (for public access, a public [static] IPv4 address) and a web browser.
- Probably the strongest recommendation for KiwiSDR is that a very strong, supportive community has formed around the KiwiSDR. My impression is that if you wanted to put a KiwiSDR online, it would be hard for you to fail because of all the support that's available.

A few concluding links:

- The primary KiwiSDR web page (start there) is http://kiwisdr.com/.
- Kickstarter page (that apparently popularized KiwiSDR) provides some historical background on KiwiSDR.
- Larry Plummer W6LVP offers a compact magnetic loop antenna that's built specifically for use with KiwiSDR.
- Philip Collier AB9IL wrote a 2022 book - **KiwiSDR: 21st Century Radio for the People: A handbook for enjoying the global network of internet connected**

shortwave radios. It's available on Amazon - search for that title. (I've ordered mine.)

- Using a public KiwiSDR is a great help when you're starting out on HF and curious how your station is being received elsewhere. Putting up a KiwiSDR (or six) is a great project for Amateur Radio clubs (and a great low-cost "starter" for potentially putting a full HF transceiver online).

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

RTL-SDR Blog V4 Dongle Initial Release!

- Improved HF Reception. Now uses a built in upconverter instead of using a direct sampling circuit. This means no more Nyquist folding of signals around 14.4 MHz, improved sensitivity, and adjustable gain on HF.
- Improved filtering. The V4 makes use of the R828D tuner chip, which has three inputs. We triplex the SMA input into three bands, HF, VHF and UHF. This provides some isolation between the three bands, meaning out of band interference from strong broadcast stations is less likely to cause desensitization or imaging.
- Improved Filtering x2. In addition to the triplexing, we are also making use of the open drain pin on the R828D, which allows us to add simple notch filters for common interference bands such as broadcast AM, broadcast FM and the DAB bands. These only attenuate by a few dB, but may still help.
- Improved phase noise on strong signals. Due to an improved power supply design, phase noise from power supply noise has been significantly reduced.
- Less heat. Due to the improved power supply design the V4 uses slightly less current and generates slightly less heat compared to the V3.

I'm impressed that RTL-SDR.com[7] disclosed this major point up front:

> **The V4 is a Limited Edition Design.** The R828D tuner chip is completely out of production now and the number of units we can produce is limited by the number of chips held by our contract manufacturer in China. They have indicated that there should be enough stockpile for about a years worth of production.

There is an impressive amount of technical detail about the V4 in the article.

News From DEF CON 31 (2023)

- Dan Romanchik KB6NU's report including 24 new Amateur Radio Operators!
- Three teams won prizes in the Hack-A-Sat contest.
- I thought that the DEF CON Ham Radio Village was a sub-event of DEF CON; turns out it's actually an organization.
- Interesting talk by Daniel Norte W0BDP - My Callsign Is My Passport - Responsible Testing And Disclosure Of Amateur Radio Websites. *Amateur Radio websites / web applications are notorious for terrible / non [existent] information security practices and there's normally no budget to get professional help.*
- Nothing mentioned (to date) from Amateur Radio Digital Communications (ARDC) (attended the 2022 event, so likely they attended this event) or Open Research Institute (ORI) (stated they would attend / exhibit).

Rattlegram (Ribbit) Available for IOS (via Testflight)

See the article 2023 ARRL Technical Innovation Awards above for an explanation of Rattlegram. For some time, the Rattlegram app had been only available for Android, but now it's available for use (testing) on IOS (Apple iPhone and iPad) via Apple's Beta Testing framework Testflight.

I hope the beta testing goes well and Rattlegram / Ribbit "graduates" from beta and becomes widely available. I think it is an excellent low-friction introduction to non-Internet / non-cellular data communications over two-way radio… *any* two-way radio including Family Radio Service (FRS), General Mobile Radio Service (GMRS), Citizens Band (CB), etc. I can imagine a few techie experimenters within FRS portable radio range using Rattlegram to exchange "off grid" messages.

Noted on the Ribbit web page:

> **We Need Mobile App Developers**
>
> If you are interested in helping, please join the Developers mailing list.

Helping out on Rattlegram / Ribbit doesn't get much more pure-play *Zero Retries Interesting* than this!

Two Pending Amateur Radio Satellites with Digipeaters

Two new Amateur Radio satellites are particularly Zero Retries Interesting per this info from AMSAT SM (Sweden).

Veronika is built by the Technical University of Košice in Slovakia and is scheduled for launch in October 2023. The article states

> The satellite will be equipped with a 24/7 digipeater on two different bands…

and also states that it will use AX.25 @ 9600 bps G3RUH modulation on 436.680 MHz, but the article doesn't mention the frequency of the second digipeater.

Besides digipeating, Veronika's other modes include:

- Experimental slow-scan digital video (SSDV) transmissions,
- AX.25 telemetry
- CW beacon
- AX.25 and CW messages on special occasions.

Initially I thought that the similarity of names to another satellite named Veronica couldn't be a coincidence, but per this article, the satellite is named for a young woman.

Other than the AMSAT SM article, I cannot find much technical detail about Veronika.

ROM-3 is built by the Romanian Federation of Amateur Radio (FRR) and is scheduled for launch in October or November 2023. The article states:

> [ROM-3's] primary mission is to act as a digital amateur radio repeater. Its secondary mission is to transmit low-resolution SSDV images in a Gaussian frequency shift keying (GFSK) mode. The tertiary mission is to transmit a CW beacon…

ROM-3 will transmit on 436.235 MHz using these modes:

- 20 WPM on CW
- 500 bps GFSK telemetry
- 5 kbps GFSK SSDV

I could not find much technical detail about ROM-3 either.

It's interesting that both satellites mention Slow Scan Digital Video (SSDV). While I'd heard of Slow Scan Television (SSTV), I had not previously heard of SSDV, but apparently it's been in use for a few years. An article from 2017 about SSDV's use on balloons is the best explanation of SSDV that I found.

Another discovery from reading this story is that Veronika's data communications capabilities are from the choice of a radio module from Spacemanic called Murgas. I ended up spending an hour looking at the details of Murgas. Murgas looks like a remarkably capable radio system for data communications and I requested some additional information from Spacemanic. Likely

Murgas will be the subject of an article in a future issue of Zero Retries.

Leave a comment

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Feedback Loop

Nice comments on Zero Retries 0112 from Paul Elliott and Gary Kohtala K7EK. Thanks folks!

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*

- **Founding Members who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT
  Founding Member 0001 - Chris Osburn KD7DVD
  Founding Member 0002 - Don Rotolo N2IRZ
  Founding Member 0003 - William Arcand W1WRA

- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.

- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org

- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
  Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.

- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!

- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.

- TAPR Packet Status Register has been published continuously since 1982.

- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA

- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)

- Modern Ham by Billy Penley KN4MKB

- Tech Minds by Matthew Miller M0DQW

The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ~~100~~ ~~200~~ ~~300~~ ~~400~~ ~~500~~ ~~600~~ ~~700~~ ~~800~~ *900+* other subscribers:

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Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA.

2023-08-18

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Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I *owe* them from *way* back).

1

I will guess that Ribbit won't do well with Digital Voice systems as such systems are optimized to encode and decode *only* human voices. It would be an interesting experiment.

2

FirstNET cellular infrastructure (by AT&T) for first responders is "built for public safety".

3

Though at least one family was able to request help, despite the lack of cellular service, by using Apple's new Emergency SOS feature .

4

Whatever your opinion is of the quality of journalism (or politics) of the Wall Street Journal and its parent company is completely irrelevant. That the WSJ is *influential* is, simply, *fact*. Thus, after reading the cited article, most WSJ readers have the impression that Amateur Radio is merely a quaint hobby of older men.

5

Two that come readily to mind are the "Little LEO" and 10 GHz proposals which called for commercial operations to share Amateur Radio spectrum on a non-interference basis, and the case was made that Amateur Radio operations were unique and sharing wasn't practical. Which, unintentionally, made a stronger case for reassigning Amateur Radio spectrum to commercial use.

6

Which is really, really hard. There's little incentive for an organization (it's too big for an individual) to put in the major (expensive) work on such a proposal for the chance of a major ARDC grant.

7

RTL-SDR.com is the name of the company, though they apparently also use RTL-SDR Blog interchangeably.